OVERVIEW OF GRETINA STATUS*

I. Y. Lee, R. M. Clark, M. Cromaz, M. A. Deleplanque, M. Descovich, R. M. Diamond, P. Fallon, A. O. Macchiavelli, F. S. Stephens, and D. Ward
Lawrence Berkeley National Laboratory, 1 Cyclotron Rd., Berkeley, CA 94720, USA

Gamma-ray energy tracking is a new concept for the detection of gamma radiation. With a gamma ray energy tracking array, the individual interactions of all the gamma rays are identified by their energies and positions. Then, using tracking algorithms based on the properties of gamma ray interactions, the scattering sequences are reconstructed. This will result in high peak efficiency, peak-to-background ratio, and position resolution. Recent research and development efforts have demonstrated that the construction of a gamma ray tracking array is feasible, and plans for constructing such array have been developed in the US and Europe.

The current US plan is to construct an array, which covers 1/4 of the total solid angle. This array is named GRETINA (Gamma Ray Energy Tracking In-Beam Nuclear Array), and is the first stage towards building the 4π array GRETA. Although it does not have the full efficiency of an array with 4π coverage, it does provide a number of new capabilities. Its better position resolution will make it a very powerful tool for experiments involving high recoil velocity, such as the study of exotic nuclei produced in fragmentation reactions. The higher efficiency for high-energy gamma rays will open new opportunities in the study of giant resonances. Its compactness will enable easy coupling with auxiliary devices, such as recoil separators and particle detectors, for more complicated experiments.

The total estimated cost of GRETINA is $17M. After reviewing the proposal, the US DOE began funding the construction in 2004 and it is scheduled to be completed in 2010. In this talk we will review recent developments of the project, including the production and testing of a 3-crystal prototype, the testing of digital electronics for signal processing, Doppler correction results from an in-beam experiment, and prototype effort for a data acquisition system.

*The GRETINA Advisory Committee coordinates the community input and participation of the development and construction. The current members of the Committee are Con Beausang, Doug Cline, Thomas Glasmacher, Kim Lister, David Radford, Mark Riley and Demetrios Sarantites. Kai Vetter, Greg Schmid and Austin Kuhn have done most of the earlier development work at LBNL. Dino Bazzacco and Th. Kroell collaborated with the LBNL group on the development of signal analysis algorithms. T. Teranishi and N. Aoi collaborated on the development of the algorithm for tracking pair-production events.